FOURTH FIVE-YEAR REVIEW REPORT FOR RAYMARK SUPERFUND SITE MONTGOMERY COUNTY, PENNSYLVANIA

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Prepared by
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Region III
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Date

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LIST OF ACRONYMS	
Aqua	Aqua America Inc.
ARAR's	Applicable or Relevant and Appropriate Requirements
CCl_4	Carbon Tetrachloride
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of Concern
DCE	Dichloroethene
EPA	U.S. Environmental Protection Agency
ESD	Explanation of Significance Difference
FYR	Five-Year Review
GWTS	Groundwater Treatment System
HBWA	Hatboro Borough Water Authority
HSCA	Hazardous Site Cleanup Act
IC	Institutional Control
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
OSWER	Office of Solid Waste and Emergency Response
OU	Operable Unit
PADEP	Pennsylvania Department of Environmental Protection
PADER	Pennsylvania Department of Environmental Resources
PCE	Perchloroethene also known as Tetrachloroethene
PCOR	Preliminary Close Out Report
PDB	Passive Diffusion Bag
POTW	Publicly Owned Treatment Works

ppb	parts per billion
PRP	Potentially Responsible Party
RA	Remedial Action
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RI/FS	Remedial Investigation / Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SARA	Superfund Amendments and Reauthorization Act (1986)
SDWA	Safe Drinking Water Act
SVE	Soil Vapor Extraction
TCE	Trichloroethene
VC	Vinyl Chloride
VI	Vapor Intrusion
VOC	Volatile Organic Compound

EXECUTIVE SUMMARY

The United States Environmental Protection Agency (EPA) Region III conducted the Fourth Five-Year Review of the Raymark Superfund Site. This report was finalized after the statutory due date. Access issues and multiple phases of the vapor intrusion investigation caused delays in finalizing this report. This Five-Year Review consisted of reviewing monitoring data on the current groundwater pump and treat system as well as off-site monitoring wells, and inspecting the integrity of the on-site low permeability cap. During the review several issues were identified and as a result, recommendations were made.

In order to simplify and expedite the remedial action, EPA divided the Site into three parts or operable units (OU) as follows:

OU1	On-Site Soil (soil/source control)
OU2	Off-Site-Groundwater (drinking water supply wells H-14 & H-17)
OU3	On-Site Groundwater (groundwater treatment system)

The remedy for the Raymark Superfund Site included: Soil Vapor Extraction (SVE) removal of contaminants from the subsurface soils and unsaturated bedrock; pumping and treatment of contaminated groundwater via air stripping and carbon adsorption; construction of a low permeability cap over the former lagoon area and installation of vapor phase carbon units on the air strippers at two local public supply wells. The Site achieved construction completion with the signing of the Preliminary Close-out Report on September 14, 1995. The trigger for this review was signing of the previous five year review in September 2008.

This Fourth Five-Year Review for the Raymark Site finds that the remedy for OU1 has been constructed in accordance with the requirements of the 1991 ROD. The immediate threats have been addressed though capping the on-site source area and the performance of SVE on contaminated soils. Institutional controls are in place to prevent exposure to onsite contaminants and to protect the engineered cap. EPA determines that the remedy for OU-1 is protective of human health and the environment since exposure pathways that could result in unacceptable risks are being controlled.

The remedy for OU-2 and OU-3 has been constructed in accordance with the 1990 ROD. The pump and treat system has been constructed and operated per the original ROD and subsequent decision documents. EPA has determined that there is no current exposure due to ingestion of groundwater that exceeds maximum contaminant levels (MCLs). In addition, appropriate institutional controls (ICs) to restrict human exposure to contaminants are in place such as the Pennsylvania Department of Environmental Protection (PADEP) Administrative Order ("512 Order") and the Montgomery County Board of Health Department's (MCHD) Division of Water Quality Management Individual Water Supply Regulation.

EPA is deferring a protectiveness statement with regard to OU-2 and OU-3 until additional information is collected and assessed with regard to the extent of the shallow groundwater contamination and vapor intrusion. This information will be obtained during additional groundwater and vapor intrusion sampling which will take place during the upcoming heating season. A protectiveness determination will be made following the review of the additional information.

GPRA Measures:

The Government Performance and Results Act (GPRA) holds federal agencies accountable for using resources wisely and achieving program results. As part of this Fourth Five-Year Review the GPRA measures have also been reviewed. The GPRA measures and their current status are provided as follows.

Environmental Indicators

Human Health: The current Environmental Indicator is Insufficient Data to Determine Human Exposure Control (HEID).

Groundwater Migration: Groundwater Migration Insufficient Data (GMID)

Sitewide Ready for Anticipated Use (RAU):

The Site was determined to be Site-Wide Ready for Anticipated Use (SWRAU) in 2008. However this determination was retracted until further information on vapor intrusion and the migration of contamination in groundwater is obtained.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Raymark Superfund Site		
EPA ID: PAD039017694		
Region: 3	**State:** PA	**City/County:** Borough of Hatboro, Montgomery County

SITE STATUS	
NPL Status: Final	
Multiple OUs? Yes	**Has the site achieved construction completion?** Yes

REVIEW STATUS
Lead agency: EPA
Author name (Federal or State Project Manager): José R Redmond Girón
Author affiliation: USEPA, Region 3USEPA, Region 3
Review period: 05/01/2013 – 09/15/2014
Date of site inspection: 10/22/2013
Type of review: Statutory
Review number: 4
Triggering action date: 09/24/2008
Due date *(five years after triggering action date)*: 09/24/2013

Five-Year Review Summary Form

Issues/Recommendations				
Issues and Recommendations Identified in the Five-Year Review:				
OU(s):OU-2 and OU-3	**Issue Category: Remedy Performance**			
	Issue: Vapor Intrusion at residences which are located above the shallow groundwater plume.			
	Recommendation: Expand VI study to other residences in vicinity of Bonair Avenue which are located above the shallow groundwater plume			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
Yes	Yes	EPA	EPA	06/30/2015
OU(s): OU-2 and OU-3	**Issue Category: Remedy Performance**			
	Issue: Additional information needed to understand the extent of groundwater contamination in the shallow, intermediate and deep aquifer.			
	Recommendation: Collect additional information to delineate extent of GW contamination and background contamination by installing new monitoring wells.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
Yes	Yes	EPA	EPA	06/30/016
OU(s): OU-2 and OU-3	**Issue Category: Remedy Performance**			
	Issue: The current groundwater treatment system may not capture the extent of contamination.			
	Recommendation: Conduct a capture zone analysis to determine extent of area being addressed by existing GWTS. Based upon the results, modify or enhance the GWTS.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
Yes	Yes	PADEP	EPA	03/31/2017

Protectiveness Statement(s)	
Operable Unit:	*Protectiveness Determination:*
OU-1	Protective

Protectiveness Statement:

This Fourth Five-Year Review for the Raymark Site finds that the remedy for OU1 has been constructed in accordance with the requirements of the 1991 ROD. The immediate threats have been addressed though capping the on-site source area and the performance of SVE on contaminated soils. Institutional controls are in place to prevent exposure to onsite contaminants and to protect the engineered cap. EPA determines that the remedy for OU-1 is protective of human health and the environment since exposure pathways that could result in unacceptable risks are being controlled.

Protectiveness Statement(s)		
Operable Unit:	*Protectiveness Determination:*	*Addendum Due Date:*
OU-2 & OU-3	Protectiveness Deferred	09/30/2016

Protectiveness Statement:

The remedy for OU-2 and OU-3 has been constructed in accordance with the 1990 ROD. The pump and treat system has been constructed and operated per the original ROD and subsequent decision documents. EPA has determined that there is no current exposure due to ingestion of groundwater that exceeds maximum contaminant levels (MCLs). In addition, appropriate institutional controls (ICs) to restrict human exposure to contaminants are in place such as the Pennsylvania Department of Environmental Protection (PADEP) Administrative Order ("512 Order") and the Montgomery County Board of Health Department's (MCHD) Division of Water Quality Management Individual Water Supply Regulation.

EPA is deferring a protectiveness statement with regard to OU-2 and OU-3 until additional information is collected and assessed with regard to the extent of the shallow groundwater contamination and vapor intrusion. This information will be obtained during additional groundwater and vapor intrusion sampling which will take place during the upcoming heating season. A protectiveness determination will be made following the review of the additional information.

I. Introduction

The purpose of the Five-Year Review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and identify recommendations to address them.

The United States Environmental Protection Agency (the Agency or EPA) is preparing this Five-Year Review Report pursuant to Section 121(c) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the National Contingency Plan (NCP). CERCLA §121(c) provides:

> *"If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews."*

EPA interpreted this requirement further in the NCP; Code of Federal Regulations (CFR) at 40 CFR §300.430(f)(4)(ii) which provides:

> *"If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action."*

This is the Fourth Five Year Review for the Raymark Superfund Site. Access issues and multiple phases of the vapor intrusion investigation caused delays in the drafting and review of this report. The signing of the Third Five Year Review on September 24, 2008 is the trigger action for this statutory review. This review was conducted for the entire Site by the Remedial Project Manager from November 2012 to July 2014. This report documents the results of the review.

This Fourth Five-Year Review is statutorily required because the implemented remedy resulted in hazardous substances being left on the Site. Specifically, hazardous substances remain in the soils on the Raymark property at concentrations which do not allow for unlimited use and unrestricted exposure. In addition, until the long-term groundwater recovery and treatment remedy achieves Site groundwater cleanup standards, contaminants also remain in the groundwater at concentrations which do not allow for unrestricted exposure.

II. Site Chronology

Table 1 Chronology of Site Events

Event	Date
Detection of solvents in soil and groundwater	November 1979
Proposed to National Priorities List	June 1988
Consent Decree entered	February 1989
NPL Listing	October 1989
Work plan for Remedial Investigation and Feasibility Study (RI/FS)	January 1990
Record of Decision (ROD) selecting groundwater remedy is signed for OU-2 and OU-3	September 1990
ROD selecting soil remedy is signed for OU1	December 1991
Construction for OU-1 (SVE system)	September 1993 to January 1994
Construction for OU-l (low-permeability cap)	September 1993 to April 1994
Construction for OU-2 (off-site vapor phase carbon unit project)	February 1993 to July 1993
Construction for OU-3 (on-site groundwater pump and treatment system)	September 1993 to December 1993
Construction complete (Preliminary Closeout Report signed)	September 1995

First FYR conducted by EPA	September 1998
State assumes responsibility for Operation and Maintenance (O&M) for low-permeability cap	July 1999
Second FYR conducted by EPA	September 2003
State assumes responsibility for Operation and Maintenance (O&M) for groundwater treatment system	September 2004
Pennsylvania Department of Environmental Protection issues Hazardous Site Cleanup Act (HSCA) 512 Order to implement institutional controls on the property	February 2, 2007
Explanation of Significant Differences eliminated the institutional control component that ensured continuous public water supply operation and treatment by the Hatboro Borough Water Authiority and required on-site institutional controls.	September 2007
Third FYR conducted by EPA	September 2008
Vapor Intrusion Study	October 2012 to Present

III. Background

Physical Characteristics

The Raymark Superfund Site (Site) is a 7-acre operating facility located on Jacksonville Road between Tanner and Markley Avenues in Hatboro, Montgomery County, Pennsylvania as shown in Figure 1. The Site is located on relatively flat ground and consists of a manufacturing building which contains office space and a wastewater treatment building. The manufacturing building was historically used to treat electroplating wastes. A metal cleaning/degreasing operation was located in the rear section of the manufacturing building and a solvent storage tank was located immediately outside this area. A septic tank was located near the wastewater treatment building. Four small lagoons were located in the rear of the property but were removed in the early 1970's.

Land and Resource Use

The Site is located in an industrial area approximately 100 feet from the nearest residence on Jacksonville Road, in the borough of Hatboro. The nearest surface water body is the Pennypack Creek. The creek is located a mile south-southwest of the Site. The public water

supply was formerly operated by the Hatboro Borough Water Authority (HBWA), which pumped groundwater from twelve large capacity wells. On October 31, 1996, Aqua America, Inc. (Aqua) acquired title to Hatboro's municipal water distribution system. Public water is currently being supplied to Hatboro residents by Aqua. There are no known residential drinking wells impacted by the Raymark Site.

Corporate Ownership

From 1948 to 1980, metal fabricating operations, including rivet manufacturing and electroplating, were conducted at the Site. The Milford Rivet and Machine Company, under two separate ownerships, operated the facility from 1948 to 1969 (Milford I) and from 1969 to 1980 (Milford II). Milford I was a subsidiary of Raybestos-Manhattan, Inc. In 1969, Milford I merged with Raybestos-Manhattan, Inc. and Milford II was simultaneously created as a subsidiary of Raybestos-Manhattan, Inc. In 1982, Milford II merged with RMFPC, which subsequently changed its name to Raymark Formed Products, Inc. In 1980, the Raymark entities ceased operations at the Site when the property was sold to Penn Fasteners, Inc. In 2005, Penn Fasteners, Inc. leased a portion of the facility to the C&L Rivet Company which used it to manufacture rivets and fasteners. Later that year, the C&L Rivet Company purchased the property from Penn Fasteners and continued to use the facility. In addition to C&L Rivet Company, the following businesses currently operate at the property: DMC Automotive, James Sheet Auto Sales, Advance Machinist Tech, and Ciao Bella Cakes.

History of Contamination

Metal fabrication operations, including rivet manufacturing and electroplating, began at the Site in 1948. Solvents containing trichloroethene (TCE) were used in manufacturing process to clean and degrease metal parts. Over several decades of manufacturing, TCE apparently leaked or spilled in areas where it was used and stored. These areas included storage tanks and four small, unlined wastewater lagoons that were located at the rear of the property. The lagoons were excavated and backfilled in 1972. TCE has not been used at the Site since 1980.

Initial Response

In late 1979, a series of environmental samples collected by EPA, the former Pennsylvania Department of Environmental Resources (PADER), now the Pennsylvania Department of Environmental Protection (PADEP), and the HBWA, revealed the presence of TCE and several other volatile organic compounds (VOCs) in 8 of 16 public supply wells. As a result, HBWA removed the affected wells from routine operation and began to supplement its water needs from an interconnection with a neighboring water company.

EPA installed a monitoring well on the Site in 1981 as part of an effort to investigate regional groundwater contamination. Soil samples were collected in 1982 from the former TCE storage tank area and from the former lagoons. In June 1983, EPA conducted a preliminary Site Investigations to determine the relative hazards posed by the Site.

In the fall of 1984, EPA initiated a second field investigation that included: installation and sampling of five monitoring wells, sampling of other nearby monitoring wells and abandoned water supply wells, and additional on-site soil sampling. On May 30, 1985, the United States filed a CERCLA and RCRA complaint in the U.S. District Court for the Eastern District of Pennsylvania against past and current owners and operators of the Site requesting reimbursement of past and future costs in connection with the Site. In 1988, a settlement was reached among the parties resulting in a Consent Decree (CD), which called for pumping and treating groundwater at Hatboro water supply wells H1, H2 and/or H3 all of which were located approximately 1,200 feet southwest of the Site. The CD, also required the construction, operation and maintenance of a groundwater treatment system at Hatboro supply well H16.

Further investigations were conducted at the Site from November 1986 through January 1987, which included extensive sampling of the soil and bedrock on-site and further sampling of monitoring wells. The Site was proposed for the National Priorities List (NPL) in June 1988 and was promulgated on the NPL in October 1989.

Basis for Taking Action

Past disposal practices at the Site resulted in groundwater and soil contamination. As a result of Site Investigations, three areas were identified as sources of TCE contamination to the ground water. The areas were the lagoon area, the solvent storage tank area and the degreaser area.

Due to contamination present in the Hatboro public water supplies, all Hatboro residents connected to the public water supply system, prior to 1979, were potentially exposed to groundwater contaminated by VOCs. Based on the risk assessment performed for this Site, exposure to soil and groundwater were associated with significant human health risks due to exceedances of EPA's risk management criteria for either the average or the reasonable maximum exposure scenarios. The following contaminants (identified as contaminants of concern) were found at levels exceeding their respective Maximum Contaminant Levels (MCLs) in the groundwater:

Table 2. Contaminants of Concern in Groundwater

trichloroethene (TCE)	1,1 -dichloroethene (1,1-DCE)
vinyl chloride (VC)	1,2-trans dichloroethene (l,2-trans DCE)
1,2-cis dichloroethene (cis-1,2-DCE)	tetrachloroethene (PCE)
1,1,1-trichloroethane (1,1,1-TCA)	carbon tetrachloride (CCL_4)

Vinyl chloride and 1,1-dichloroethaene (1,1-DCE) were not found in the onsite well PF-1, but are degradation products of TCE and were found in offsite downgradient wells.

Tetrachloroethene (PCE), 1,1,1-trichloroethane (1,1,1-TCA) and carbon tetrachloride (CCL_4) were not related to the Site as expressed in the 1990 ROD; nevertheless, their presence in offsite wells were used for the risk assessment calculations. These contaminants were used to calculate cumulative risk associated with the Site, because they were found in offsite wells. They are considered to be non-site related contaminants according to the 1990 ROD.

The following contaminants were identified as contaminants of concern in the soil:

Table 3. Contaminants of Concern in Soil

trichloroethene (TCE)
tetrachloroethene (PCE)
1,2-dichloroethene (1,2-DCE)

IV. Remedial Actions

Remedy Selection

Initial remedial activities at the Site were conducted pursuant to a 1989 Consent Decree Work Plan, which called for pumping and treating groundwater at Hatboro water supply wells H1, H2 and/or H3 all of which were located approximately 1,200 feet southwest of the Site. Also, Hatboro agreed to design, install, operate and maintain two vapor phase carbon adsorption units on two off-site wells H-14 and H-17. In addition, the 1989 Consent Decree, also required the construction, operation and maintenance of a groundwater treatment system at Hatboro supply well H16.

In order to simplify and expedite the remedial action, EPA divided the Site into three parts or operable units (OU) as follows:

OU1	On-Site Soil (soil/source control)
OU2	Off-Site-Groundwater (drinking water supply wells H-14 & H-17)
OU3	On-Site Groundwater (groundwater treatment system)

In January 1990 EPA completed its Remedial Investigation/Feasibility Study (RI/FS) report. The RI/FS revealed the presence of volatile organic compounds (VOCs), primarily TCE, at the Site all of which are listed in Table 2 above.

In September of 1990, EPA issued a Record of Decision (ROD) for the groundwater portion (OU2 and OU3). The Remedial Action Objectives (RAOs) established in the 1990 ROD

are as follows:

1) Protect public health and the environment;

2) Reduce further migration of contaminated groundwater from the Site towards public supply wells;

3) Contain the contamination within the currently affected area;

4) Reduce risk resulting from release of contaminants into the air from treatment devices; and

5) Contribute to the restoration of the aquifer to its beneficial use, and further to background quality, if practicable.

The major components of the Groundwater Remedial Alternative selected in the 1990 ROD are as follows:

- Operation and Maintenance (O&M) of the air stripping towers on public water supply wells;
- Vapor phase carbon adsorption on air stripping towers;
- Groundwater extraction and treatment of on-site contaminated groundwater from beneath the Site;
- Pipeline from on-site Groundwater Treatment System to storm sewer system; and
- ICs to ensure that the HBWA continues to operate public water supply wells equipped with treatment systems as part of the groundwater remedy.

In an effort to restore the aquifer to beneficial use, the remediation system implemented in each of the alternatives was intended to operate until the contaminant levels reach MCLs, non-zero Maximum Contaminant Level Goals (MCLGs), or background, whichever is lower.

The ROD for the on-site soil remedy (OU1), was signed on December 30, 1991. The COCs are volatile organic compounds, primarily trichloroethene (TCE), and are listed in Table 3 above. The Remedial Action Objectives (RAOs) established for this 1991 ROD are as follows:

1) Protect public health and the environment;

2) Reduce amount of contamination in subsurface soil and bedrock such that leaching of contamination to groundwater is minimized;

3) Minimize leaching of residual contamination from the Site (as established in Section V. of the 1991 ROD) to the groundwater such that levels of TCE in groundwater do not exceed 5 parts per billion (ppb) or background, whichever is lower, as defined in the 1990 ROD for onsite and offsite groundwater; and

4) Reduce risk resulting from release of contaminants into the air from treatment devices.

The major components of the Soil Remedial Alternative in the 1991 ROD are as follows:

- Vapor extraction of VOCs from subsurface soils;
- Vapor extraction of VOCs from unsaturated bedrock;
- Vapor phase carbon adsorption of extracted air;
- Low permeability cap to minimize infiltration through soil and resultant leaching to groundwater; and
- ICs to ensure integrity of low permeability cap.

The cleanup goal for remediation of the soils from the lagoon area, solvent storage tank area and degreaser area was 50 ppb TCE. This number was calculated as the maximum amount of TCE allowable in soil to prevent further migration of contamination from the soil into the groundwater.

When the remedy was selected in 1990 for OU2 and OU3, it was uncertain if the cleanup goals throughout the contaminated aquifer could be achieved. EPA determined that background levels, defined by using upgradient concentrations, may be higher than health-based levels due to the existence of other sources of contamination near the Site. Consequently, it may be technically impracticable to achieve the cleanup goals until other sources are addressed.

In 1991, EPA conducted detailed groundwater studies to determine a pumping strategy to

prevent continued migration of contaminated groundwater from the Site. A Modification to the 1989 Consent Decree was lodged in the U.S. District Court for the Eastern District of Pennsylvania on June 29, 1994. As a result of public comment and the proposed purchase of Hatboro's water production and distribution system, Hatboro and the United States, with the concurrence of PADEP, reached agreement on the terms for a newly revised Amended Work Plan, dated April 16, 1996 ("1996 Version") to incorporate this new data. The Court ordered performance of the amended remedial activities by entering the 1996 Consent Decree Modification.

A subsequent Modification to the 1989 Consent Dcree provided a revised Amended Work Plan "developed by EPA for work to be performed at the Site based upon the preferred alternative set forth in the September 28, 1990 Record of Decision for Operable Units 2 and 3." The Court ordered the performance of the amended remedial activities by entering the 2005 Consent Decree Modification.

In September 2007, EPA issued an Explanation of Significant Difference (ESD) to eliminate the monitoring and treatment of off-site wells H14 and H17. Wells H14 and H17 are being impacted by known regional contamination which includes potential non-site sources of contamination. Given that the other sources of contamination are not being addressed, EPA determined that it may not be possible to achieve clean-up goals within the Hatboro Regional Aquifer and that remediation of the wells may be impractical and ineffective due to the presence of the other sources.

Another component of the ESD eliminated the ICs that required Hatboro Borough to continue to operate certain public water supply wells as part of the remedy (wells equipped with treatment). Since the issuance of the 1990 ROD, Hatboro sold its entire municipal water distribution system to a private company (Aqua) and operation of these wells is no longer required as part of the remedy.

In addition, EPA determined that other institutional controls are necessary to assure long term protection of human health and the environment. Institutional controls are necessary for the protection of the integrity of the on-Site groundwater treatment system. Accordingly, EPA modified the remedy selected in the 1990 ROD to call for additional institutional controls to ensure long-term protection of human health and the environment and to protect the integrity of the groundwater treatment system. EPA relied on the following two mechanisms as means of implementing these ICs.

On February 2, 2007, PADEP issued an Order pursuant to Section 512(a) of the Pennsylvania Hazardous Sites Cleanup Act (HSCA), 35 P.S. § 6020.512(a) to the current owners of the Site property. The HSCA § 512 Order restricts the installment of new groundwater wells, new construction or activities on the capped areas and its surroundings (without the approval of PADEP) that may impact the engineered remedies.

EPA identified the Montgomery County Board of Health Department's Division of Water Quality Management Individual Water Supply Regulations (MCHD Regulations), adopted on February 1, 1997 and amended on August 1, 2003, as an institutional control for the contamination outside of the Site property. Pursuant to Section 17-2, the MCHD Regulations established "minimum standards for location, construction, modification or abandonment of individual water supply wells and system installation for protection of public health and welfare". The MCHD Regulations protect potential human exposure to contaminated groundwater attributable to the Site by limiting the drilling and installation of new wells in the groundwater plume. As of April 2014, there are no drinking wells registered with the MCHD in the Borough of Hatboro. The entire Borough is currently using public water except for a small part of Warminster Avenue, located to the southeast of the Site.

Remedy Implementation

In February 1989, Raymark Industries, Inc., Raymark Formed Products Company, Penn Fasteners, Inc., and two individual Site owners (Defendants) entered into a Consent Decree with

EPA (Plaintiff) and Hatboro Borough Authority (Plaintiff-Intervenor). In exchange for payment from the Settling Defendants, Hatboro agreed to design, install, operate and maintain two vapor phase carbon adsorption units on two off-site wells (H-14 and H-17). Pursuant to the Consent Decree, EPA agreed to design construct, operate and maintain an on-site groundwater extraction and treatment system including two extraction wells, RW-1 and MW-3D (MW-3D later collapsed and was replaced with extraction well R-3). Additionally, EPA agreed to design, install, operate and maintain a vapor phase carbon adsorption unit as part of the on-site treatment system. Figure 2 is a map of the Site which shows the location of on-site wells.

Remedial activities for OU2 began in February 1993 and were completed in July 1993 by EPA's contractor. In September 1993, EPA signed a remedial action report certifying that the remedy was operational and functional.

The construction of the soil vapor extraction system (OU-1) began in September 1993 and was completed in January 1994. The system was run until the 50 ppb cleanup goal was met by mid-October of 1995. The second major component of OU-1 was the cap to cover contaminated soils in the area of the former lagoons. A multilayer low-permeability cap was constructed from September 1993 through April 1994 and occupies approximately 1 acre and an asphalt cap occupies approximately 1.5 acres. Both caps, prevent exposure to contaminated soils, as well as migration of any contamination under them. EPA signed a remedial action report certifying that the remedy for OU1 was operational and functional in September 1994 (See Figure 3).

PADEP took responsibility for OU1 operation and maintenance (O&M) in July 1999. PADEP took responsibility for OU2 and OU3 O&M in September 2004.

System Operation/Operation and Maintenance/Groundwater Sampling

Long-term monitoring and maintenance activities are conducted by PADEP in accordance with the updated O&M Manual. The GWTS pumps two on-site groundwater extraction wells R1 (at 135' bgs) and R3 (190' bgs) and treats TCE contaminated groundwater

by air stripping. The treated water gets discharged into local sanitary sewer lines, where it then goes to a waste water treatment plant. PADEP provides routine monitoring reports to EPA on an annual basis. If something out of the ordinary in terms of issues or status occurs between reports, PADEP notifies EPA.

PADEP performs the following tasks on an on-going basis:

- Annual sampling of groundwater from monitoring wells.
- Monthly sampling of GTWS influent and effluent.
- Weekly analysis of discharged air with a Photo Ionization Detector for indication of contaminant breakthrough from the granular activated carbon units.
- Proper maintenance of the GWTS granular activated carbon units which adsorb TCE from an incoming air stream and discharge the air into the atmosphere. These carbon units are to be replaced when VOC levels of 2 ppm or greater are detected in the discharge air.
- Inspection of the cap, fence and surface water management features and mowing the grass twice a year.

PADEP has performed the requested tasks. They maintain the GWTS in accordance with the O&M Manual, maintain the capped lagoons, and collect the appropriate samples from the GWTS and monitoring wells.

V. Progress Since Last Five-Year Review

This is the Fourth Five-Year Review for the Raymark Superfund Site. The Third five year review protectiveness statement read as follows:

"This third Five-Year Review for the Raymark Site finds that the remedy has been constructed in accordance with the requirements of the ROD and is functioning as designed. The immediate threats have been addressed though capping the on-site source area, performing SVE on contaminated soils and pumping and treating the contaminated groundwater. Groundwater exceeds Maximum Contaminant Levels (MCLs) for TCE and PCE. Proper

Operation and Maintenance (O&M) reporting and groundwater treatment system (GWTS) optimization should be pursued.

A protectiveness determination of the groundwater portion of the remedy cannot be made until further information is obtained with regard to vapor intrusion. It will take between 18 to 24 months to gather this information. A protectiveness determination will be made at that time. Other than possible vapor intrusion, EPA has determined that there is no current exposure to groundwater that exceeds MCLs. In addition, appropriate institutional controls are in place."

The issues and recommendations and follow up actions identified in the 2008 Five-Year Review follow:

Table 4: Issues in the 2008 Five-Year Review

Issues	Affects Current Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
Report proper operation and maintenance of the GWTS	N	N
Vapor Intrusion potential not known	Y	Y
Optimize GWTS	N	N

Table 5: Recommendations and Follow-up Actions in the 2008 Five-Year Review

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
O&M reporting not required	Develop an O&M Plan and submit a report annually to EPA	PADEP	EPA	September 2009	N	N
Vapor Intrusion Evaluation	Obtain additional information about the contaminant concentrations in shallow groundwater at the downgradient edge of our monitoring network.	EPA	PADEP	June 2009	Y	Y
Vapor Intrusion Evaluation	Perform vapor intrusion evaluation, if needed.	EPA	PADEP	September 2010	Y	Y
Optimize GWTS	Develop a plan to focus on increasing the effectiveness of the groundwater extraction and treatment system.	PADEP	EPA	September 2010	N	N

Actions taken to resolve the issues identified above:

Issue # 1. "Report proper operation maintenance of the GWTS": The 1990 ROD (OU2), established the need for the installation, operation and maintenance of the different aspects of the selected remedy. It also required the periodic sampling of groundwater and treated water. The Third Five Year Review identified a deficiency in the O&M associated with the GWTS, specifically reporting and housekeeping issues.

Since the Third Five-Year Review, PADEP has performed several sampling events, which included collecting samples from the extraction wells and the monitoring wells. PADEP has shared those findings with EPA. In 2003, PADEP updated their O&M plan for the Site. They commited to annual reports and to routine inspections, sampling and maintenance at the Site. Two shutdown rebound test have been conducted to observe the effect of turning off the extraction wells. One which took place from November 2012 to June 2013, and one that started in September 2013 through June 2014.

Issue #2. "Vapor Intrusion potential not known": During the 2008 Five-Year Review, EPA determined that vapor intrusion (VI) was a potential pathway of exposure. EPA attempted to collect samples from two monitoring wells (R-1 and R-2) which are west of the Site and on Southeastern Pennsylvania Transportation Authority (SEPTA) property. After two years of attempting to obtain access from SEPTA, EPA drilled two new wells in 2010 to replace the wells on SEPTA property. Data from the new wells indicated that a VI study was necessary.

Issue #3. "Vapor Intrusion potential not known": During the winter of 2013, EPA obtained samples from thirteen (13) residences to evaluate VI (see Figure 4). The houses were chosen based on their downgradient proximity to the Site and agreeing to participate in the study. The study consisted of ambient air samples, sub-slab air samples, and indoor air samples in both the basement and first floor of the houses.

The study determined that there is a possibility for VI and that VI is occurring in some of

the houses. However, the concentrations encountered at the houses where VI is occurring are low enough not to represent an immediate threat to human health.

Issue #4. "Optimize GWTS": During the 2008 Five-Year Review, it was recommended that a plan be developed to increase the effectiveness of the groundwater extraction and treatment system. That recommendation has not been fulfilled by PADEP.

VI. Five-Year Review Process

Administrative Components

The Five-Year Review team included José R. Redmond Girón, EPA Remedial Project Manager; Ryan Bower, EPA Hydrogeologist; Nancy Rios Jafolla, EPA Toxicologist; Yvette Hamilton, EPA Counsel; Alexander Mandell, Community Involvement Coordinator (CIC); Joe McDowell, EPA VI Specialist; Colin Wade, PADEP's project manager; and Patricia Flores, EPA Air specialist. This review began in January 2013.

Community Involvement

The EPA RPM and CIC have had regular communication with the Hatboro Borough Manager Fred Zollers, to discuss the Five-Year Review process over the past two years.

The Agency placed an advertisement in the Hatboro Public Spirit on August 18, 2013 notifying area residents of the upcoming Five-Year Review. The RPM and CIC did not receive any questions or comments as a result of the advertisement. EPA has participated in Hatboro Borough Council meetings on several occasions to present updates regarding the Site.

Document Review

The Five-Year Review consisted of a review of relevant information regarding the Site which included the CDs, RODs, ESD, previous Five-Year Review reports, the 2001 Optimization Plan, EPA Optimization Report (2005), O&M plan, and data provided by PADEP.

Data Review

Groundwater

Environmental data provides information to assess and demonstrate that a remedy is achieving the performance standards described in the ROD, and provides information for the Five-Year Review. Sampling at the different monitoring wells is done yearly. The wells that are sampled are the nested wells MW-1, in the shallow, intermediate and deep (S, I, D), MW-2(S, I, D), MW-3(S, I, D) intervals. There is a data gap for the years 2009 and 2010, the sampling results cannot be located. Listed below in Table 4 is a summary of the results of the monitoring events performed at the Site from 2011 to 2013.

The groundwater was analyzed for volatile organic compounds. Well data from 2011 to 2013 indicates TCE continues to be present in groundwater throughout the Site. Two nested well sets (R1 and R2) were installed on Bonair Avenue in 2011 to delineate downgradient groundwater contamination and investigate the potential for vapor intrusion in nearby residences. TCE and its degradation product 1, 1-DCE were the only COCs that were detected in most wells (including the newly installed wells) above MCLs (1,1-DCE was found in MW-R1(D) above MCLs). TCE was the only COC detected in all wells at a concentration above the MCL. PCE was also detected in well in MW-2S, MW-3S and MW-3D above the MCL at some point since the last Five-Year Review.

The recently installed downgradient wells reveal high levels of TCE in the deep wells. MW-R1D ranges from 455 - 656 ppb, MW-R2D ranges from 53.9- 64.7 ppb. The concentrations in the shallow zone are significantly lower. MW-R1S has a concentration of 2 ppb for both sampling events and MW-R2S ranges from 18.3 to 22.1ppb. This indicates that contamination is increasing with depth as it migrates from the source area.

Groundwater data from the nested wells at MW-2 indicate significant TCE contamination in the intermediate and deep zones. There appears to be a decreasing trend of TCE contamination in the intermediate zone from 2011 to 2013 (575 down to 370 ppb). However, the

TCE in the deep zone shows only a slight decrease in contamination at MW-2. The presence of TCE at the other monitoring wells (although above MCL in some cases) it is at least an order of magnitude less that at MW-2I and MW-2D. In addition to the issues mentioned above, the significant presence of TCE at MW-R1 (D), suggests a need for further groundwater delineation. This will be accomplished with the installation of deep monitoring wells (deeper than 125' bgs).

Table 6. Raymark Contaminants of Concern in MWs (2011-13)

Well:	Date:	TCE (µg/L):	PCE (µg/L):	1,1-DCE (µg/L)
MW-1S [50 ft]	5/19/2011	6.3	ND	ND
	5/31/2012	2.3	ND	ND
	11/20/2012	2.7	ND	ND
	4/30/2013	2.6	ND	ND
MW-1I [110 ft]	5/19/2011	6.4	ND	ND
	5/31/2012	0.99	ND	ND
	11/20/2012	0.79	ND	ND
	4/30/2013	1.5	ND	ND
MW-1D [140 ft]	5/19/2011	0.81	ND	ND
	5/31/2012	2.6	ND	ND
	11/20/2012	0.93	ND	ND
	4/30/2013	0.99	ND	ND
MW-2S [47 ft]	5/19/2011	1.1	9.8	ND
	5/31/2012	1.4	17.4	ND
	11/20/2012	1.4	18.3	ND
	4/30/2013	1.2	9.6	ND
MW-2I [100 ft]	5/19/2011	575	1.8	4.8
	5/31/2012	528	2.3	5.9
	11/20/2012	450	1.5	4.7
	4/30/2013	370	0.82	2.8
MW-2D [145 ft]	5/19/2011	143	ND	1.8
	5/31/2012	131	ND	4
	11/20/2012	121	ND	3.9
	4/30/2013	130	ND	4.3

Table 6. Raymark Contaminants of Concern in MWs (2011-13) (cont.)

Well:	Date:	TCE (µg/L):	PCE (µg/L):	1,1-DCE (µg/L)
MW-3S [42 ft]	5/19/2011	6.6	15.6	ND
	5/31/2012	7.9	ND	ND
	11/20/2012	7.8	ND	ND
	4/30/2013	2.4	12.3	ND
MW-3I [100 ft]	5/19/2011	1.3	0.62	ND
	5/31/2012	1.1	0.79	ND
	11/20/2012	1.9	ND	ND
	4/30/2013	2.1	0.51	ND
MW-3D [152 ft]	5/31/2012	4.5	8.6	ND
	11/20/2012	4	8.6	ND
	4/30/2013	9.5	ND	ND
MW-R1(S) [32 ft]	11/20/2012	2	ND	ND
	4/30/2013	2.1	ND	ND
MW-R1(D) [73 ft]	11/20/2012	656	ND	52.9
	4/30/2013	455	ND	31.4
MW-R2(S) [42 ft]	11/20/2012	18.3	ND	ND
	4/30/2013	22.1	ND	ND
MW-R2(D) [78 ft]	11/20/2012	59.6 (53.9)	ND	1.6(1.6)
	4/30/2013	64.7	0.51	1.6

Key:		
Yellow Highlighted Cells: Concentration exceeds Maximum Contaminant Level.		
(X): Results in parenthesis denotes duplicate result.	**ND**: Non Detect.	[X] Approx. depth of Screen at monitoring wells.
TCE: MCL= 5ppb;	**PCE:** MCL= 5ppb;	**1,1-DCE:** MCL= 7ppb

Since 2009, there been reductions of TCE concentration in the extraction wells (see figures 5 and 6). When these results are compared with the early 2000 levels, the reduction has been of one order of magnitude. During this review, the concentration has fluctuated between non-detect (RW-3, Oct 2012) and 150 ppb (RW-1, Jan 2009). Although the perception is that concentrations of contaminants are decreasing; the presence of TCE in MW-2 nested wells, could be an indicator that the capture of contaminants with the pump and treat system is not efficient. TCE contamination travels vertically more easily than horizontally and migrates into

the intermediate and deep aquifer. Downward migration is facilitated by fractures within the aquifer, but contamination also follows the regional groundwater gradient in the shallow bedrock from the site in a southwest – west direction.

Table 7. Raymark TCE Concentration in Extraction Wells (ppb)

2009												
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
RW-1	150	111		75	73.4	75.4			14.2	99.6	66.7	56.5
RW-3	147	81.1		80.3	75.2	56.1			0	47.7	45.6	45.6
2010												
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
RW-1		56.8	43.9		37.6		59.1	17.5	10.2			54.4
RW-3		57.9	45.6		35.8		37.6	35.6	38.4			29.2
2011												
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
RW-1		18.9	40.5	23.6	18.4	17.7	12.1	27.2	14	8.3		
RW-3		33.8	24.1	27.3	25.2	25.5	26.3	23.2	23.8	20.3		
2012												
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
RW-1	12.3	12.7	11	7.9	7.9	3.1	3.2	1.4	5.9	8.4		
RW-3	23.1	23.9	24.3	27.8	27.8	24.3	31.7	25.9	27.8	ND		
2013												
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
RW-1							66.3	21.9				
RW-3							25.8	21.3				

The empty spaces in the above table correspond to months when there was no sampling due to technical issues at the extraction wells. From November 2012 to June 2013 the system was shut down for a rebound test performed by PADEP. The initial concentrations following the rebound test in RW-1 was higher than the previous two years. At the moment of the issuance of this report, the system is shut down in order to perform another rebound test.

The extraction wells are being pumped at a depth of 135 feet for well RW-1 and 190 feet for RW-3. Well RW-3 is a replacement well drilled in 1999 due to the collapsed of the original well MW-3D. The pumping rate identified in the CD was a combined rate of 60gpm. During an optimization study (2005), EPA determined that the pumping rate should be approximately

48gpm. Since 2005, the GWTS has been operating at 48 gpm, except for during pump maintenance and the two rebound tests mentioned above.

Vapor Intrusion

A vapor intrusion study is currently underway at the Site. Between February and March 2013, ambient air, indoor air and subslab vapor samples were collected to investigate the potential for vapor intrusion in 13 nearby residences. The 13 residences are located on Tanner Avenue, Jacksonville Road, East Monument Ave. and Bonair Ave.

The analytical results for indoor and outdoor ambient and subslab air samples were compared to residential inhalation risk screening values derived from EPA Regional Screening Levels (RSLs). Twenty-nine VOCs were detected in the 57 air/vapor samples collected. Ten VOCs were detected at levels that exceeded their respective EPA residential health-based screening value and five VOCs (1,1,1-TCA; CCl_4; PCE; TCE and cis-1,2-DCE) are listed in the Site's ROD as COCs in groundwater. The following table shows the COCs that were detected and the total number of samples in which they were reported. The number in parenthesis shows the number of samples that exceeded the inhalation screening value.

Table 8: Frequency of COC Detection during VI Study

Frequency of COC Detections			
Site COC	**Indoor Air Samples (out of 30 samples)**	**Subslab Vapor Samples (out of 20 samples)**	**Outdoor Air Samples (out of 7 samples)**
1,1,1-TCA	6(0)	8(0)	1(0)
CCl_4	22(22)	8(8)	5(5)
CIS-1,2-DCE	1 (0)	0 (0)	0 (0)
PCE	11(0)	9(4)	1(0)
TCE	15 (15)	12 (12)	3 (3)

The number in parenthesis shows the number of samples that exceeded the inhalation screening value

Three COCs were detected at concentrations above their respective screening value. The COC detected most frequently was CCl_4, reported at detectable levels 35 of the 57 samples collected. All detections of carbon tetrachloride were reported at concentrations above the inhalation screening level (0.41 $\mu g/m^{3)}$. Carbon Tetrachloride concentrations ranged between 0.64 $\mu g/m^3$ to 13 $\mu g /m^3$. Of those 35 samples where carbon tetrachloride was detected, 30 of them were below 1 $\mu g/m^3$, including all outside air samples. The other five samples fluctuated between 1.3 $\mu g/m^3$ and 13 $\mu g/m^3$, all were subslab samples and four out of the five were at Bonair Ave.

The COC TCE was reported in 30 of the 57 samples. All TCE detections were at concentrations above the screening value of 0.21 $\mu g/m^3$. TCE detections ranged from 0.27 $\mu g/m^3$ to 2,800 $\mu g/m^3$. Twelve of the 30 TCE detections were reported from subslab samples taken from nine separate residences. TCE was detected most frequently in subslab samples collected from residences located along Bonair Avenue: four of the five residences sampled exhibited TCE in subslab samples. At the remaining residence on Bonair Avenue, it was not possible to collect a subslab sample due to the thickness of the slab. Two of the five residences sampled along East Monument Avenue had TCE detections in subslab samples. One residence each was sampled on Tanner Avenue, Jacksonville Road, and Wood Avenue. All three exhibited TCE in subslab samples.

Seven of the nine residences with TCE detections in subslab samples also had TCE detections in indoor air samples. The indoor air sample concentrations ranged from 0.22$\mu g/m^3$ to 9.6$\mu g/m^3$. Three residences had detections of TCE in indoor air samples, but did not have TCE detections in subslab samples (one of these residences did not have a subslab sample collected due to the slab construction). EPA has evaluated the 9.6 ug/m^3 concentration of TCE found in the indoor air in the basement of one residence. The data suggests that there is another source within the building. The concentration found in the subslab sample was 1.3 $\mu g/m^3$ and the first floor sample had a detection at 0.66 $\mu g/m^3$. The concentration in the basement air was significantly higher than what would be expected when compared to the subslab, indicating that

there is another source of TCE unrelated to the Site within this building. EPA examined the concentrations of contaminants encountered in the indoor air at the different residences, and determined that the indoor air is within the acceptable cancer risk range of 10^{-6} and 10^{-4} and a hazard index less than one for Site related contaminants. There is no immediate risk for the residents from Site related contaminants.

PCE was the last COC detected at levels exceeding its screening value of 4.2 $\mu g/m^3$. The four detections of PCE above the screening value were all subslab samples at Bonair Avenue. Also, three out of the four houses with PCE detection in the subslab, also had detections of PCE in the indoor air sample, although those detections were below the screening value.

Several of the properties that were sampled showed evidence of actual or potential vapor intrusion of Site COCs. Analytical data revealed that the highest concentrations of COCs found in subslab vapor occurred at properties along Bonair Avenue. Regardless of this, VI it is not a current threat for human health due to the low concentrations found at those residences. It could potentially be in the future; therefore, further investigation efforts are warranted.

The next phase of the VI study is to resample some of the affected residences to confirm the previous results. The study area has been expanded to include additional properties near Bonair Avenue to determine if Site related COCs are present at concentrations of concern further downgradient from the Site. A series of shallow wells will be installed to study the groundwater flow and further delineate the plume. Once the plume is delineated, additional areas for VI sampling will be identified. Upon completion of the VI study, a report will be issued.

Site Inspection

A key component of the Five-Year Review at the Raymark Superfund Site is the physical inspection of the groundwater treatment system, its components, a visual inspection of Site wells, and visual inspection of the low-permeability cap. The EPA RPM Jose R. Redmond, EPA's CIC Alex Mandell, and PADEP project manager Colin Wade inspected the Site on October 22, 2013.

The overall visual inspection of the Site buildings, fenced entryway, asphalt paved areas, low-permeability cap and perimeter fence revealed no damage or deterioration. EPA relied on PADEP's institutional knowledge of the current operations and maintenance of the Site. No issues were identified during the Site inspection.

Interviews

The EPA RPM and CIC have been in regular communication with the Hatboro Borough Manager Fred Zollers, to discuss the process relating to the Five-Year Review, the VI study and the new well installation over the past two years. The EPA met last with the Borough Manager on April 23, 2014. During this period, EPA has attended various Borough Council public meetings to update the citizens about events related to the Site. No major concerns has been expressed to EPA.

VII. Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

No. Although the cap and fence are in working order, and the GWTS is being operated by PADEP, it appears that the groundwater treatment system is not completely effective in controlling the migration of site contaminants. With the exception of 2009 and 2010, PADEP has performed the annual sampling of Site monitoring wells and the monthly sampling at the extraction wells according to their O&M Plan. Institutional controls are in place to protect human health by preventing human exposure to contaminated soil and groundwater. Because of the continued presence of elevated levels of COCs at the Site (in particular at the intermediate and deep interval of the wells), it is recommended that additional wells be installed and a capture zone analysis be performed to evaluate if the groundwater extraction and treatment system is effective in capturing contaminated groundwater.

Question B): Are the exposure assumptions, toxicity data, clean up levels, and remedial action objectives (RAO) used at the time of the remedy still valid?

No. Of the conditions mentioned at question B; vapor intrusion has been identified as a possible exposure pathway of concern, which was not considered at the time the remedy was selected. Also the toxicity data of some COCs has changed, some becoming more stringent, other becoming more relaxed.

Changes in Standards and TBCs

Have standards identified in the ROD been revised, and does this call into question the protectiveness of the remedy? Do newly promulgated standards call into question the protectiveness of the remedy? Have TBCs used in selecting cleanup levels at the site changed, and could this affect the protectiveness of the remedy?

No. The groundwater standards currently in effect were established in the 1990 ROD for OU2 and OU3. The cleanup standards were set based on MCLs or background levels whichever is lower. In the same document it is mentioned that due to the nature of contamination in the region, background levels would not be sufficient to protect human health and the environment. Thus, the cleanup standards would be based on MCLs. The MCLs for the COCs have not changed and are still considered protective.

Changes in Exposure Pathways

Has land use or expected land use on or near the site changed?

No. Since the 1990 ROD, there have not been any changes to land use on or around the Site. Local land use remains a mixture of commercial and residential uses.

Have human health or ecological routes of exposure or receptors been newly identified or changed in a way that could affect the protectiveness of the remedy? Are there newly identified contaminants or contaminant sources? Are there unanticipated toxic byproducts of the remedy not previously addressed by the decision documents? Have physical site conditions or the

understanding of these conditions changed in a way that could affect the protectiveness of the remedy?

Yes. The VI pathway has been identified as a potential pathway of concern. A VI study is currently underway at the Site. During this Five-Year Review, questions have come up regarding the extent of shallow groundwater contamination and the presence of contaminants in the intermediate and deep intervals of the wells. In order make a protectiveness determination, additional vapor intrusion investigations should be conducted. The remaining conditions examined during the development of the CDs, RODs, and ESD have not changed in ways that would affect protectiveness of human health or the environment.

Changes in Toxicity and Other Contaminants Characteristics

Have toxicity factors for contaminants of concern at the site changed in a way that could affect the protectiveness of the remedy? Have other contaminant characteristics changed in a way that could affect the protectiveness of the remedy?

Some toxicity factors have changed, some have increased while others have decreased, making it difficult to determine if the risks would be higher or lower if recalculated today. It is likely that current toxicity values may change again in the future, and protectiveness should be assessed when the groundwater cleanup has been completed. Therefore, it is recommended that the groundwater risks be evaluated at the end of the remedy to ensure protectiveness at that time.

Changes in Risk Assessment Methods

Have standardized risk assessment methodologies changed in a way that could affect the protectiveness of the remedy?

There have been significant changes in EPA's risk assessment guidance since both RODs for the Site. These include changes in dermal guidance, inhalation methodologies, exposure factors, and a change in the way early-life exposure is assessed for vinyl chloride. However, these changes do not currently affect the protectiveness of the remedy.

Current risk assessment guidance may change again in the future, and protectiveness should be assessed when the groundwater cleanup has been completed. Therefore, it is recommended that the groundwater risks be evaluated at the end of the remedy, to ensure protectiveness at that time. In the interim, groundwater is not being used and is not expected to be used for potable purposes.

Expected Progress towards Meeting RAOs

Is the remedy progressing as expected?

The groundwater extraction system continues to remove contaminant mass from the aquifer. Results from wells R1 and R2 installed in Bonair Ave., as well as subslab samples at the houses on Bonair Avenue suggest that several of the properties sampled during a vapor intrusion investigation are being impacted by contaminants from the Site. Those apparently impacted houses should be resampled to confirm the 2013 results. The groundwater study area will be expanded by adding several wells in the vicinity of Bonair Avenue to determine if site related COCs are present in groundwater. The vapor intrusion study area will also be expanded to identify any possible new areas of groundwater contamination based on the sampling of the new wells. There is a possibility of encountering a new contamination source that has not been addressed before or a link with the contamination related to the Site. Sampling at all monitoring wells and extraction wells should continue. A delineation of the contamination plume should be established with the new series of wells and a current background levels should be established for the Site and the groundwater extraction and treatment system should be optimized to increase the removal of contaminant mass. A capture zone analysis should be conducted after all of the new information regarding the plume is gathered.

Question C): Has any other information come to light that could call into question the effectiveness of the remedy?

Yes. The installation of new wells (R1 & R2) has shown that contamination in the deep interval of the aquifer goes beyond the immediate vicinity of the Site. Also the possibility of vapor intrusion at residences on Bonnair Avenue from contaminants that may be originating

from the Site may call into question the effectiveness of the remedy.

Technical Assessment Summary

Based on the data reviewed and the site inspections, there is reasonable doubt about the effectiveness of the selected remedy. There have been no changes in the physical condition of the Site. The standards for cleanup (MCLs) have not changed, and conditions at the Site have not changed since the issuing of the RODs. However, concerns with VI, insufficient information about intermediate and deep groundwater contamination and lack of a capture zone analysis call into question the effectiveness of the remedy.

In order to address these issues, it is recommended that the VI study be expanded to evaluate other residences in the Bonair Avenue vicinity. Bonair Avenue was the location where the highest concentrations of COCs were found in the subslab during the VI study. Additional sampling is planned to be completed in late 2014 (October to December) and early 2015 (January to March).

EPA also plans to install a series of nested monitoring wells in 2014 to further delineate the shallow groundwater contamination. The shallow wells should help to determine the extent of the shallow groundwater contamination as well as the extent of the vapor intrusion study area. The deeper wells will provide the opportunity to gather data to determine the extent of the ground water contamination in the intermediate and deep interval of the aquifer. The last recommendation is to conduct a capture zone analysis, which will be used to evaluate the effectiveness of the groundwater extraction system. Once the capture zone analysis is complete, the groundwater treatment system will most likely need to be optimized.

A protectiveness statement is being deferred until additional information is collected and assessed with regard to vapor intrusion. In addition, further information should be gathered with respect to the extent of the plume and the effectiveness of the groundwater treatment system

VIII. Issues

Table 9. Issues Identified

Issues	Affects Current Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
VI at residences which are located above the shallow groundwater plume.	Y	Y
Additional information needed to understand the extent of groundwater contamination in the shallow, intermediate and deep aquifer.	Y	Y
Current groundwater extraction and treatment system may not capture the extent of contamination.	Y	Y

IX. Recommendations and Follow-Up Actions

Table 10. Recommendations and Follow-up Actions

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
VI at residences which are located above the shallow groundwater plume.	Perform indoor air and subslab sampling at other residences in vicinity of Bonair Ave. located above the shallow plume.	EPA	EPA	06/30/15	Y	Y

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
Additional information needed to understand the extent of groundwater contamination in the shallow, intermediate and deep aquifer.	Collect additional info to delineate extent of GW contamination and background contamination by installing new monitoring wells.	EPA	EPA	06/30/16	Y	Y
Current groundwater extraction and treatment system may not capture the extent of contamination.	1) Conduct a capture zone analysis to determine extent of the area being addressed by existing GWTS. 2) Based upon the results, modify or enhance the GWTS.	PADEP	EPA	03/31/17	Y	Y

X. Protectiveness Statement

This Fourth Five-Year Review for the Raymark Site finds that the remedy for OU1 has been constructed in accordance with the requirements of the 1991 ROD. The immediate threats have been addressed though capping the on-site source area and the performance of SVE on contaminated soils. Institutional controls are in place to prevent exposure to onsite contaminants and to protect the engineered cap. EPA determines that the remedy for OU-1 is protective of human health and the environment since exposure pathways that could result in unacceptable

risks are being controlled.

The remedy for OU-2 and OU-3 has been constructed in accordance with the 1990 ROD. The pump and treat system has been constructed and operated per the original ROD and subsequent decision documents. EPA has determined that there is no current exposure due to ingestion of groundwater that exceeds maximum contaminant levels (MCLs). In addition, appropriate institutional controls (ICs) to restrict human exposure to contaminants are in place such as the Pennsylvania Department of Environmental Protection (PADEP) Administrative Order ("512 Order") and the Montgomery County Board of Health Department's (MCHD) Division of Water Quality Management Individual Water Supply Regulation.

EPA is deferring a protectiveness statement with regard to OU-2 and OU-3 until additional information is collected and assessed with regard to the extent of the shallow groundwater contamination and vapor intrusion. This information will be obtained during additional groundwater and vapor intrusion sampling which will take place during the upcoming heating season. A protectiveness determination will be made following the review of the additional information.

XI. Next Review

Once the additional groundwater and vapor intrusion information are evaluated, an addendum to this Five-Year Review will be issued. The next Five-Year Review for the Raymark Superfund Site is due five years from the signing of this document.

Figures

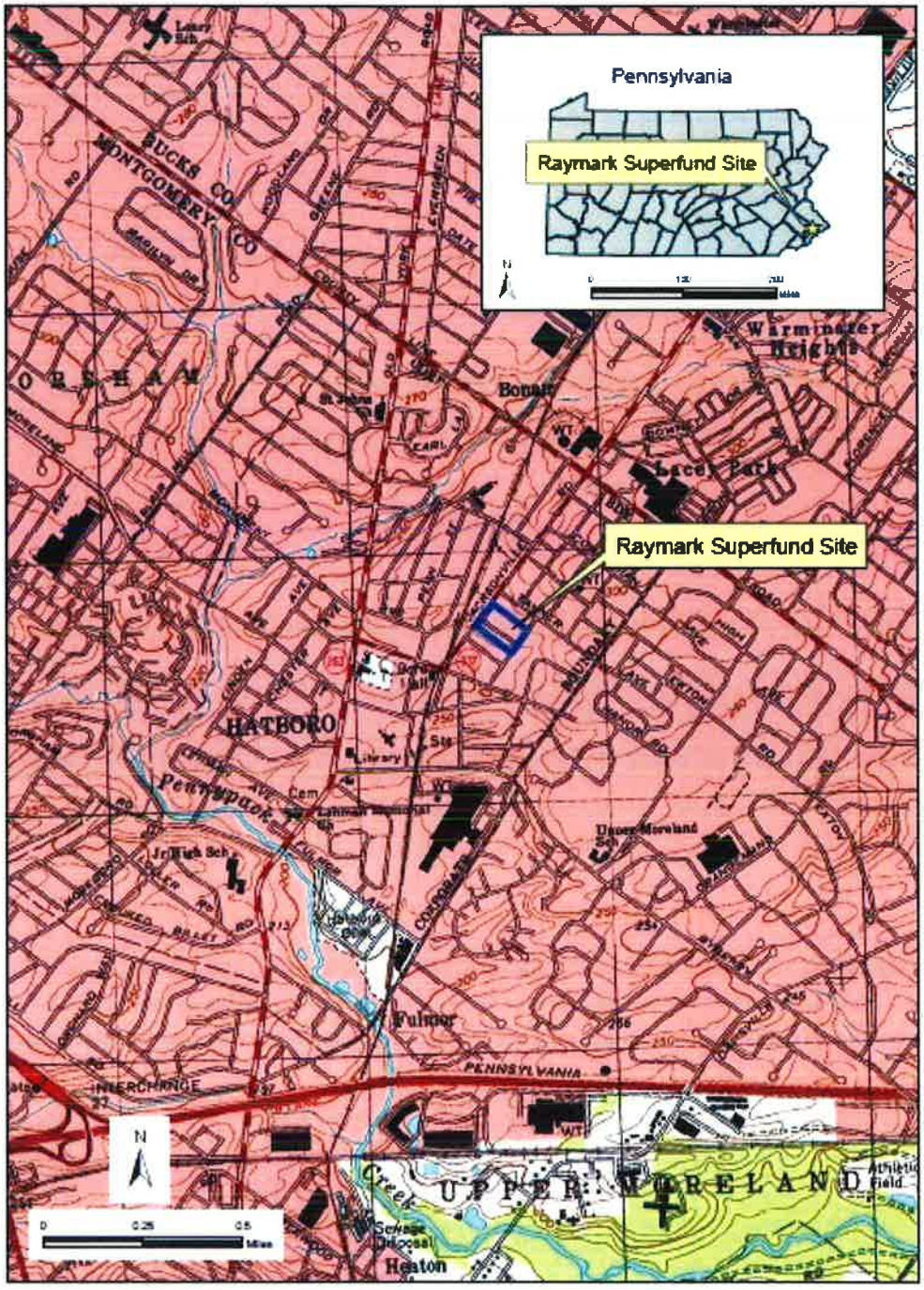

Figure1. Site Location

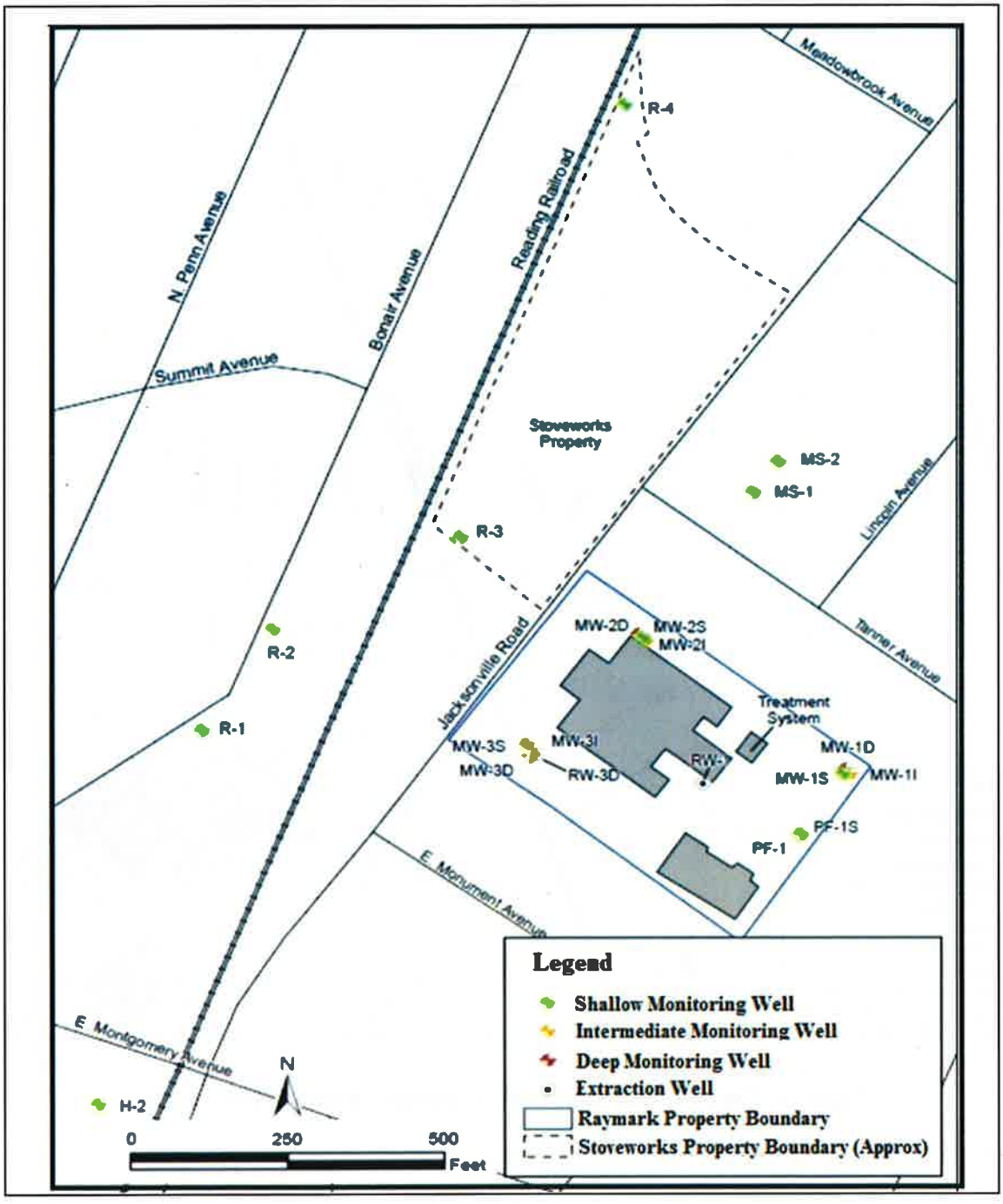

Figure 2. Site Map and Monitoring Wells at the Property

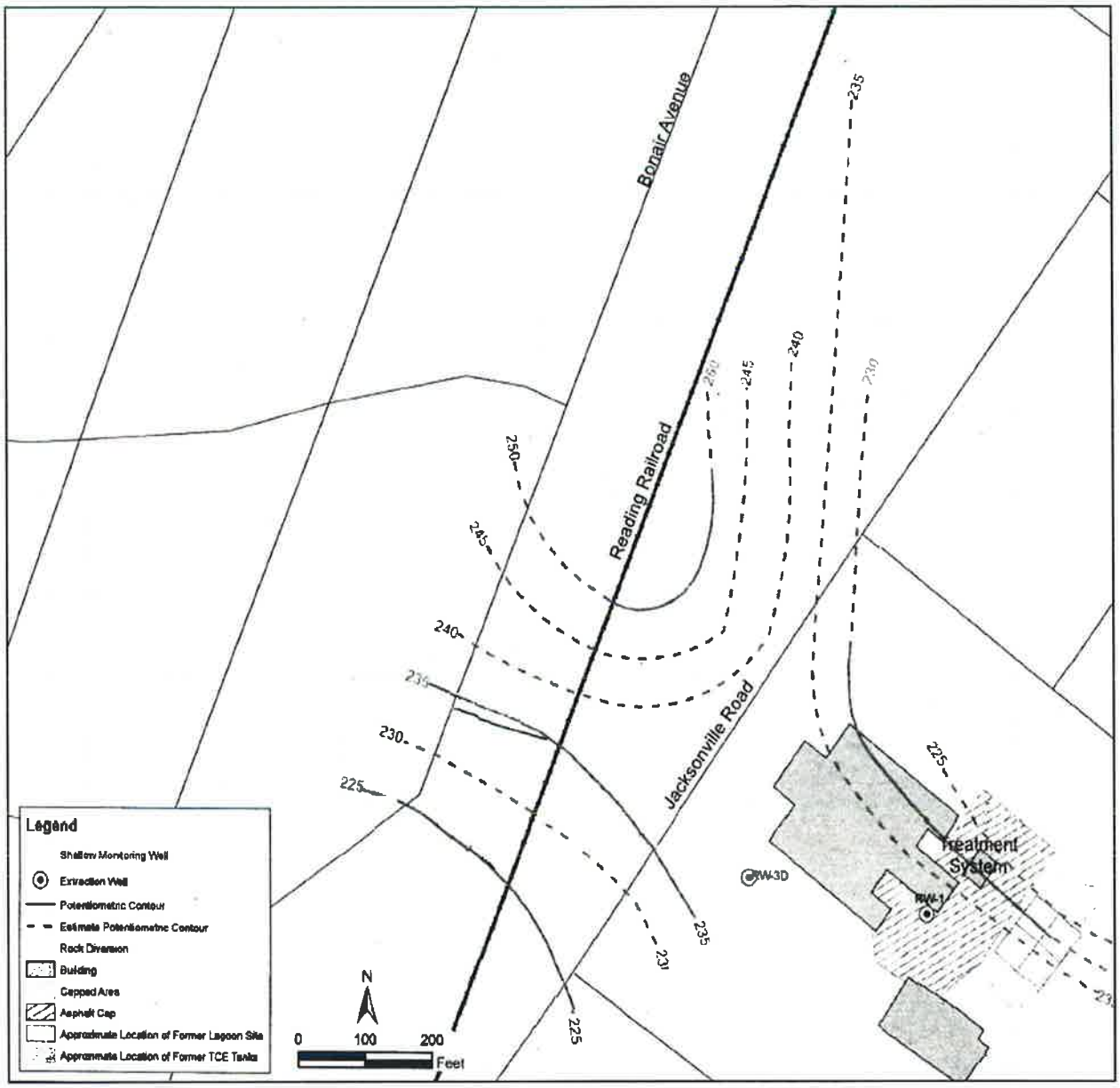

Figure 3. Capped Area and Former Lagoon Areas at the Property

Figure 4. Vapor Intrusion Study Area and Former Area of Contamination

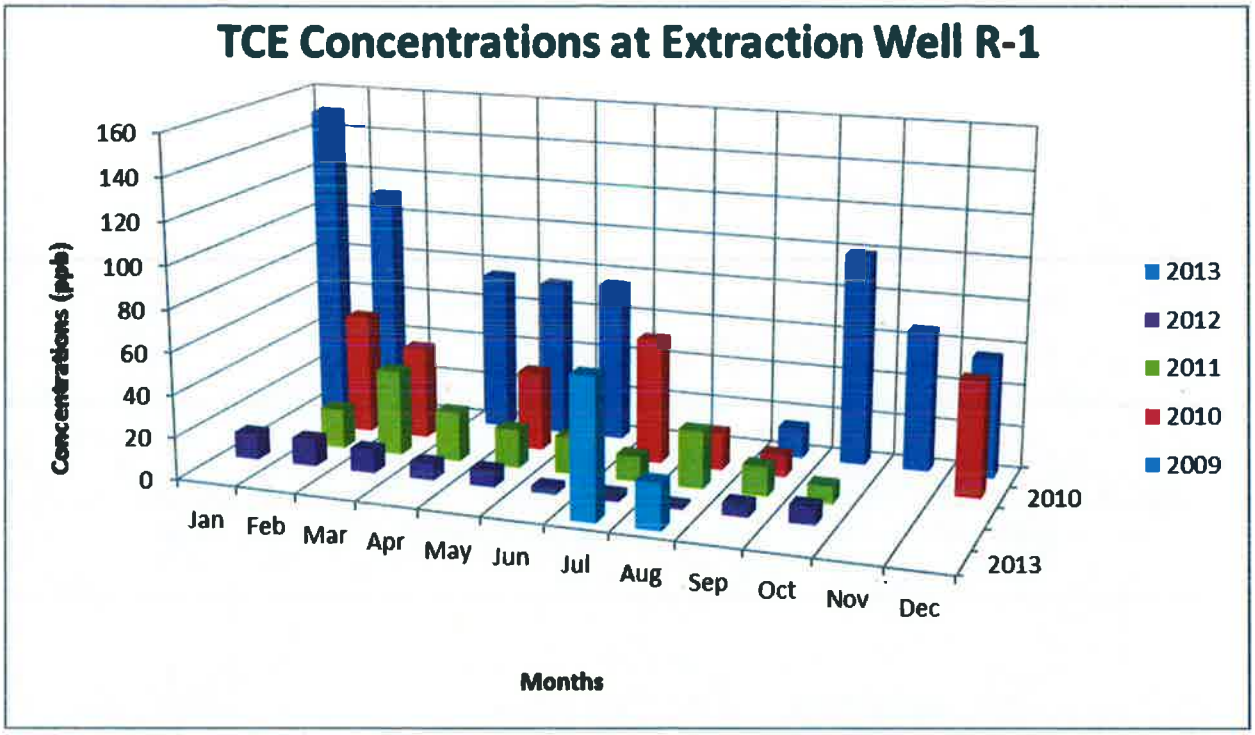

Figure 5. TCE Concentration at Extraction Well R-1

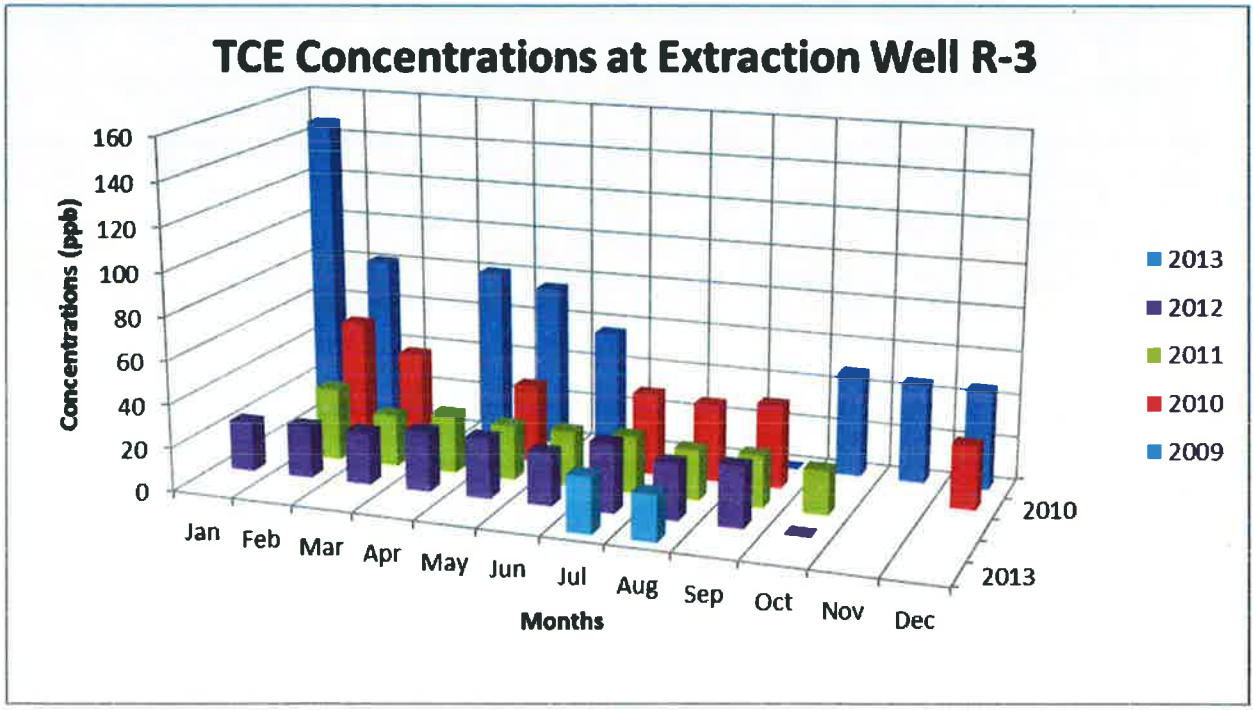

Figure 6. TCE Concentration at Extraction Well R-3